Modular Learning Systems
for Mechatronics Training

FESTO

MPS®: Modular Production Systems

Use individual stations to teach a variety of technologies and automation principles.

Teach Technology Fundamentals
- Pneumatics
- Hydraulics
- PLC Controls
- Robotics
- Sensors

Teach Automation Processes
- Pick & Place
- Testing and Quality Inspection
- Workpiece Processing
- Workpiece Sorting
- Robotic Assembly
- Workpiece Storage and Retrieval
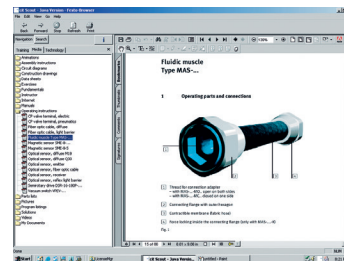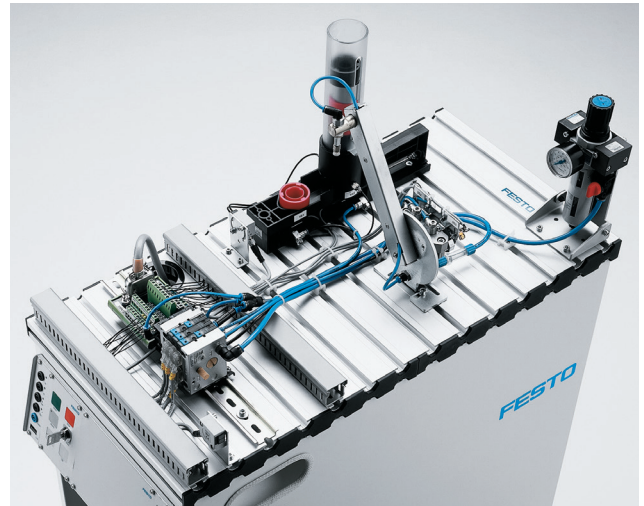
Project Work
Mechatronics Assistant software contains project exercises for each MPS® station, enhancing training in Mechatronics.

MPS® Combinations

MPS® System Modularity

- Combine various individual stations to expand the scope of learning topics
- Mix and match station combinations to enhance the learning process
- Build learning lab capabilities within budgetary guidelines
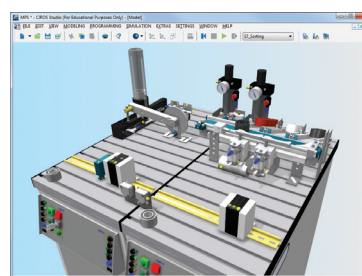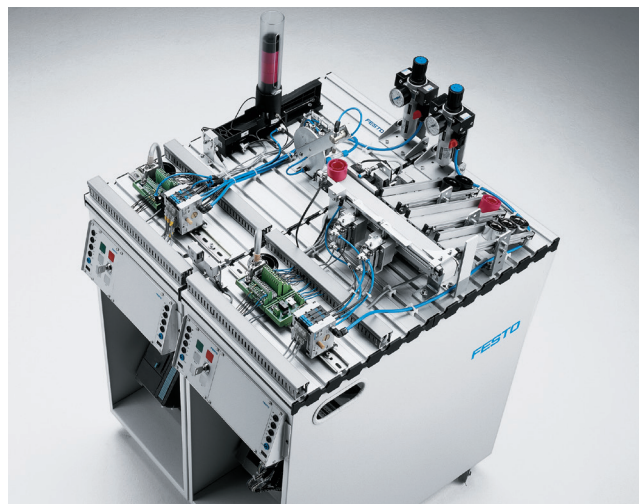

Blended Learning Packages
Each MPS® 200 system includes a package of web-based training programs as well as teaching resources, FluidSIM Pneumatics, and Mechatronics Assistant.

Flexibility and Modularity

Automation Processes

Fully-integrated automation training, combining mechanics, pneumatics, electrical engineering, PLC control, and communication interfaces.

- Individual stations can be combined into a linear production line
- Data transfer via PLC control signals
- "Hand-shaking" signals using infrared sensors to process workpieces through the production line
- System communications via standard I/O protocols
- PLCs from various manufacturers can be used
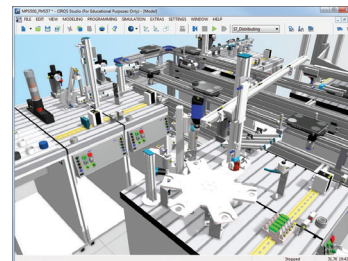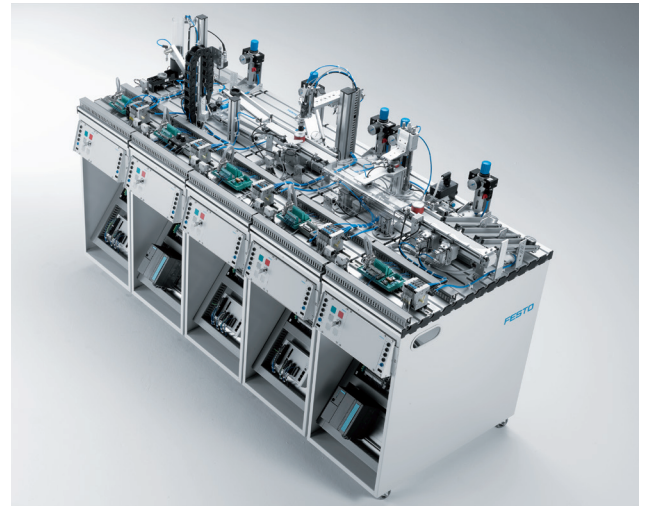
Simulation Software
CIROS® for PLC training and robot simulation enables students' programming projects to be exported for operation of external hardware after simulation review.

Flexible Manufacturing

- MPS® stations stations can be combined into flexible manufacturing workcells
- Workcells can be arranged in various sequences as desired
- Conveyor system is used to transport workpieces among workcells
- Workcells can be removed for individualized training
- PLCs from various manufacturers can be used concurrently
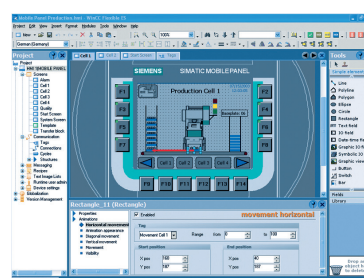
Process Visualization and Control
System visualization and operation with industrial SCADA (Supervisory/System Control) software. Communications via Fieldbus, Ethernet, ProfiBus or DeviceNet™.

MPS® Stations: Teaching Mechatronics Through Practical Applications

New
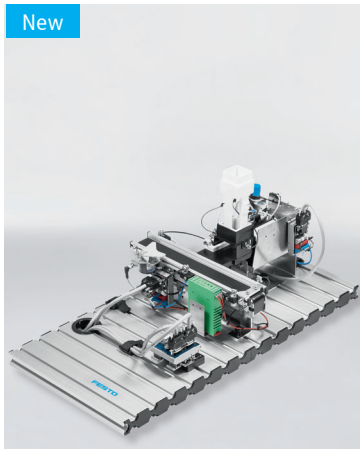
Distributing/Conveyor Station

Separates parts and feeds them into a process that conveys the parts to the left or right.
- Belt control, clockwise/ counter-clockwise rotation
- Stopping and separating
- Circuit diagrams
- Magnetic limit switches, opto-electrical sensors
- Tubing and wiring

New
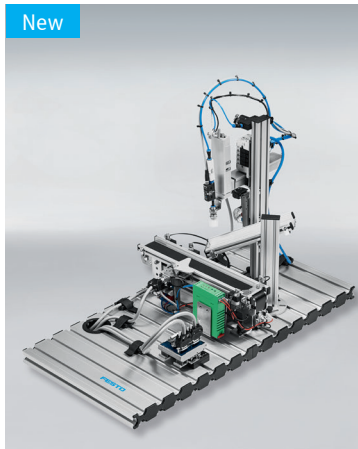
Pick & Place Station

Separates and picks up parts and transports them to conveyor
- Magnetic limit switches, opto-electrical sensors
- Vacuum and gripper technology
- Tubing and wiring
- Handling systems
- Belt control

New

Robot Station

Basic industrial robot equipped with six-axis articulated arm by Mitsubishi, pneumatic gripper, Teachbox, controller, and service unit.
- Mechanical structure
- Optical sensors
- Industrial robotics applications
- Safety switches

New
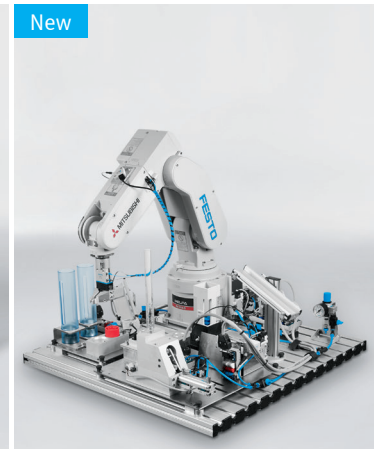
Robot Station with MPS® Modules

Feeds, sorts, and assembles pneumatic cylinders and places them on a slide.
- Handling and assembly
- Complex assembly environments
- Mainenance, servicing, and troubleshooting
- Programming, sensors, and actuators
- Multitasking applications
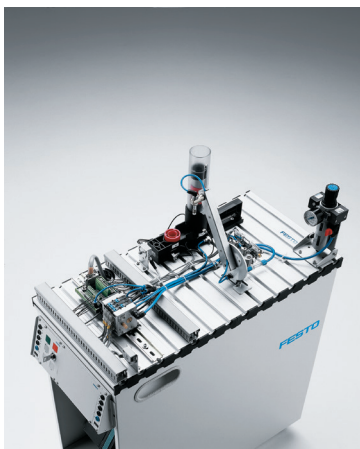
Distributing Station

Separates parts from a stack and feeds them into a process.
- Linear actuators
- Semi-rotary actuators
- Vacuum technology
- Pneumatics
- Optical, proximity and contact sensors
- PLC programming
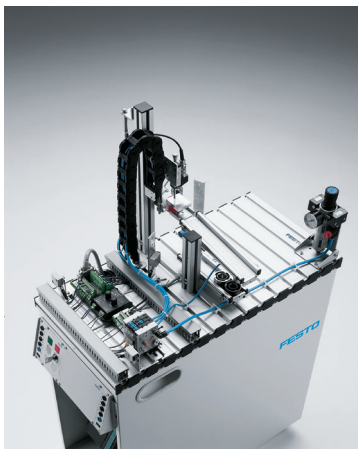
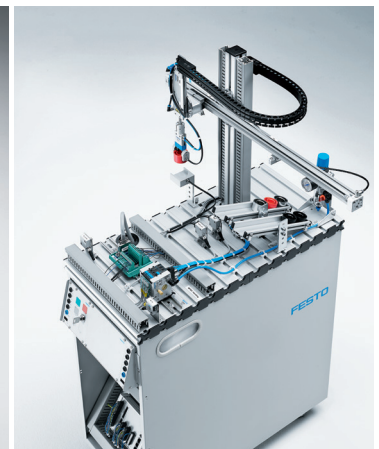### Testing Station

Material recognition and quality control.
- Rodless cylinders
- Flow control
- Optical and capacitive sensors
- Analog technology
- Correct wiring of electrical components
- PLC programming
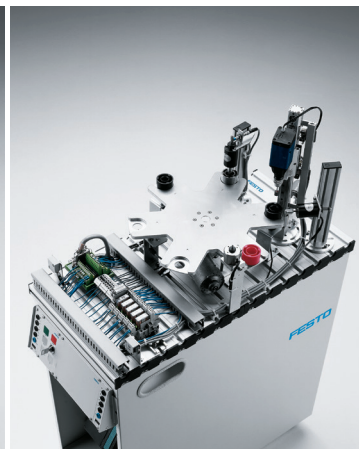
Processing Station

Electrical rotary table models common industrial processes.
- Sensors locate parts at pickup and processing points
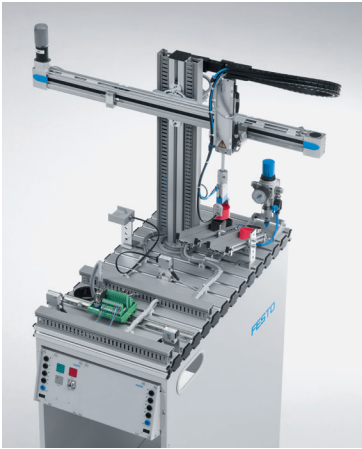- Proximity sensors locate correct alignment of rotary table
- Sample applications such as machining and quality control

Handling Station, Pneumatic

Modern pick-and-place application that sorts, moves, and transfers parts.
- Industrial handling components
- Pneumatic linear axis
- Optical sensor
- Limit switches
- Pneumatic gripper
- Broad range of handling tasks

Handling Station, Electrical

Modern pick-and-place application that sorts, moves, and transfers parts.

- Industrial handling components
- Electrical linear axis with DC Motor
- Optical sensor
- Limit Switches
- Broad range of handling tasks
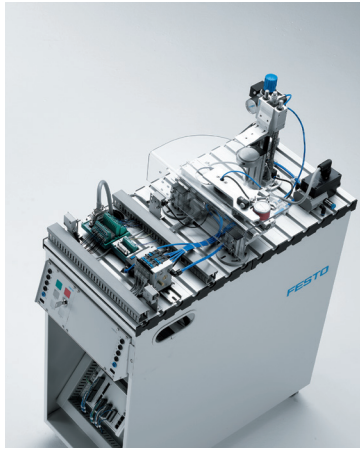
Fluidic Muscle Press Station

Presses parts into housings using pneumatic muscle.

- Pressure can be regulated via analog or digital signal
- Application of pneumatic muscle, linear drive SLG, semi-rotary actuator DRQD
- End-position and analog sensors
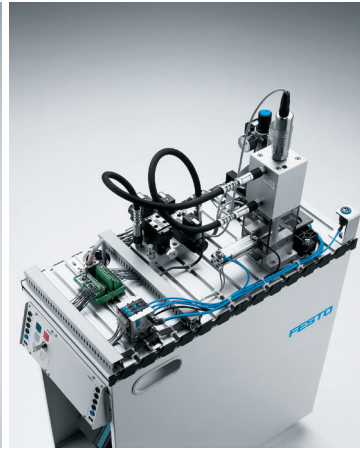
Hydraulic Punching Station

Removes parts from a stack and uses hydraulic forces to punch a hole.

- Pressure and force
- Linear motion
- Inductive and optical sensors
- Hydraulic applications
- Sensors for part positions and pressure
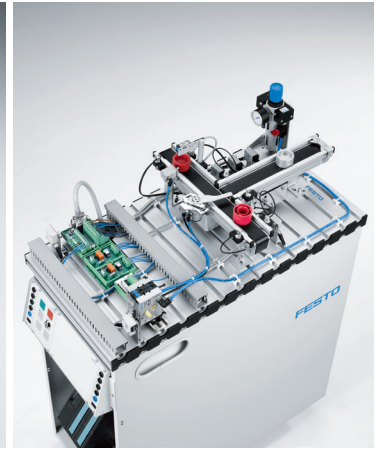
Separating Station

Separates parts into two different material flow directions based on drilled hole depths.

- Differentiate workpieces and flow
- Analog diffuse sensors check hole depth and supply analog and binary output signals
- Fiber-optic through beam sensors and optical sensors monitor material flow on the conveyors
- Permits creation of flexible assembly lines
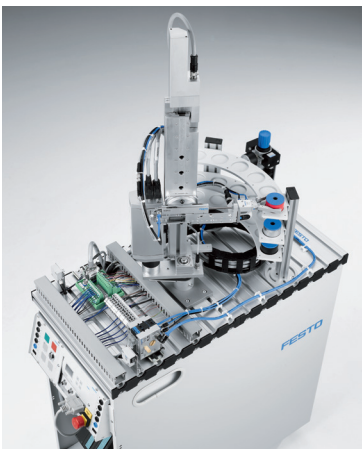
Storing Station, Electric

Places parts in and takes them out of storage. Three storage levels.

- Linear movement executed using a cylinder
- Rotary movement performed by electrical servo drive and integrated controller
- Stroke movement executed using electrical linear axis with separate controller
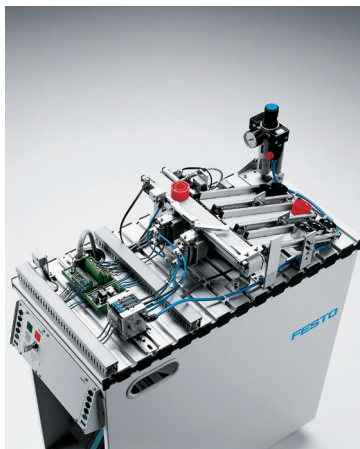
Sorting

Sorts parts by color and moves them via an electrical conveyor belt.

- Sensor array to distinguish colors
- Linear motion to set deflectors
- Proximity sensors verify process completion
- Optical sensors monitor number of parts in each slide

Commission-it-Yourself

- Attach control console to trolley with two bolts
- Connect EduTrainer® Universal to control console and start using our universal SysLink connector
- Ready to go!

MPS® Commissioning Service

Festo provides:

- Complete commissioning of your new system
- Instruction in technical documentation and Mechatronics Assistant, program structures, and lesson preparation using Mechatronics Assistant
- Useful tips on how to get the most from the MPS®

MPS®: Teaching Automation Processes

MPS® won the Worldidac Award in 1998, 2000, and 2002
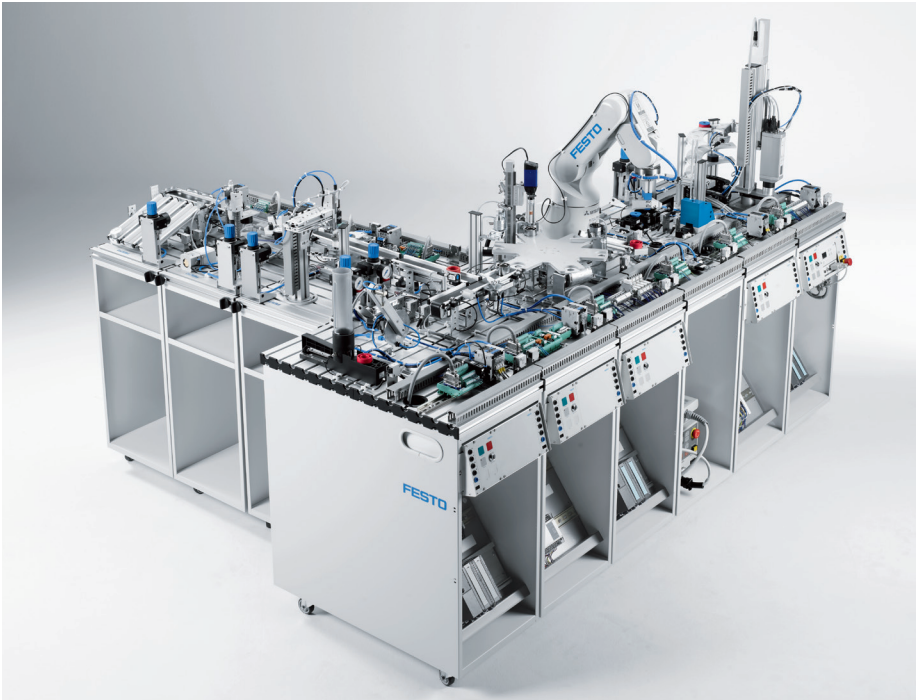
Mechatronics

Mechatronics is the synergistic combination of mechanical engineering, electrical engineering, electronics, information technology, and systems thinking utilized in the design of products and automation processes.
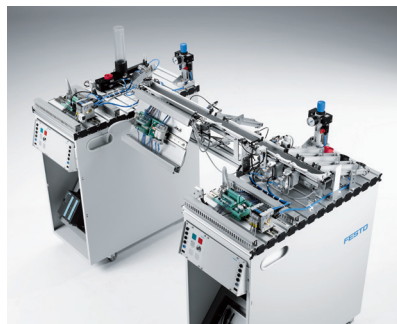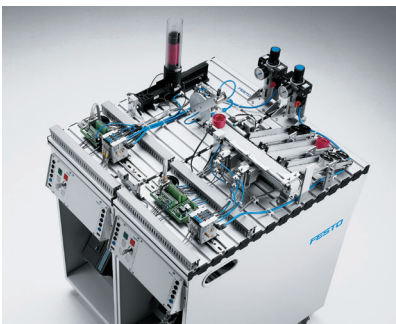
Festo Learning Systems products provide the ideal environment for Mechatronics training. Our wide variety of products, including hardware, simulation software, web-based training products, and a broad array of curriculum, combine to provide the educator with the most comprehensive, industrial-based training programs available worldwide.

Technical training objectives include the ability to:
- Analyze functional relationships in mechatronic systems
- Manufacture mechanical components
- Follow information and energy flow in electrical, pneumatic, and hydraulic sub-systems
- Plan and organize work flow
- Commission, troubleshoot, and repair mechatronic systems
- Communicate using industrial network protocols, including DeviceNet™ and ProfiBus

MPS® Combinations

A new interface concept offers many possibilities for direct combination of individual stations.
- Capstone projects can be developed for advanced training
- Pre-designed combinations packaged with additional resource materials, Mechatronics Assistant, and FluidSIM®.
- Infrared handshaking utilized to move workpieces through the production process
- Pick-up and drop-off points align to allow workpieces to transfer seamlessly

Combination using a Conveyor

The conveyor enables all MPS® stations to be interconnected. The conveyor is simply mounted between two stations as a linking element, facilitating the set-up of customized training solutions.

MPS®: Teaching Flexible Manufacturing

## Expand Your Mechatronics Training with Factory Simulations

Adding a conveyor to existing MPS® stations enables training in flexible manufacturing.

- Network communication among workcells
- Production planning and optimization
- Production controlled by PLCs
- Workcells can be configured to your aims and budgets

Harness the full capacity of your factory training with the addition of:

- Multi-axis robots
- Hydraulic operations
- Vision systems
- Servo-electric drives
- Storage and retrieval system
- Supervisory software that allows students to observe their programs in action

## Simulation and Control Software
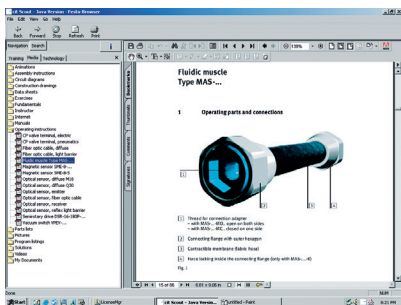
Mechatronics Assistant

- Resource for teaching Mechatronics
- Full documentation and programs for all MPS® stations
- Contains assembly drawings, schematics, and data sheets for each station
- Pre-designed student exercises can be printed as needed
- Students can research information on their own
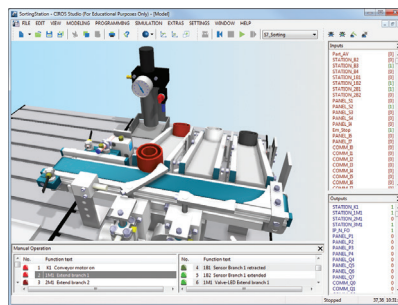
CIROS® for PLC Training

- Simulation models of each MPS® station
- Teach PLC programming and master troubleshooting using software instead of hardware
- Student-written programs can drive external hardware
- Flexible troubleshooting mode records student activities
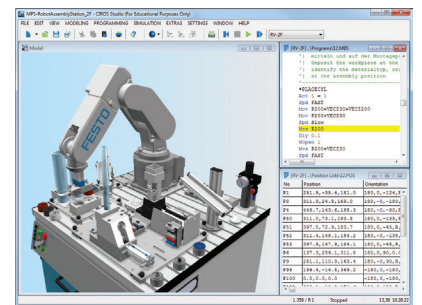
CIROS® for Robot Simulation

- Simulation software to teach robotics
- Learn the history and vocabulary of robots
- Understand what makes a robot work
- Write programs and position lists for robots in pre-designed workcells
- Extended versions operate with robots of major manufacturers

Your Ideal Partner for Technical Education

Maximize learning success

Festo Didactic and Lab-Volt joined forces to offer you a wide range of systems and solutions for technical education.

Our expanded team helps you design and implement learning laboratories, educational equipment, and programs that train people to perform in highly dynamic and complex environments.

Whether you are involved in public or private educational institutions, government institutions, public administration, or industrial companies, contact us to discuss your needs and challenges.

We support and assist you

Festo Didactic offers a variety of training options. You can take part in teacher training and info events or visit us at numerous trade shows. You can also book instructor training sessions, as they represent a cost-effective way to increase the return on your investment.

The Training and Consulting team offers a wide scope of training services covering three skills areas – Technology, Organization, and People – and the three factors in productivity – Quality, Time, and Cost.

Festo Didactic also owns and/or operates Learning Centers on behalf of companies and governments in many countries.

Your partner, worldwide

We speak your language! And we are just around the corner – in more than 100 countries around the world. We will gladly visit you at your school, office, or home – whether you need information, are looking for advice before making an investment, or have questions about everyday use of the products. We are always only a phone call or an email away!

To view the entire range of Festo Didactic solutions, visit:
➜ **www.festo-didactic.com**

For more information about LabVolt Series products, go to:
➜ **www.labvolt.com**

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Connect with us

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Global Industry Partner of WorldSkills International

world**skills**

MPS® won the Worldidac
Award in 1998, 2000, 2002

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